

**Nebraska Information Technology Commission**

**Project Proposal Form**

**New or Additional State Funding Requests  
for Information Technology Projects**

**FY2003-05 Biennium**

<b>Project Title</b>	<b>KMNE-TV NTSC Replacement Transmitter</b>
<b>Agency/Entity</b>	<b>Nebraska Educational Telecommunications Commission</b>

**Project Proposal Form**  
**FY2003-05 Biennium****About this form...**

The Nebraska Information Technology Commission ("NITC") is required by statute to "make recommendations on technology investments to the Governor and the Legislature, including a prioritized list of projects, reviewed by the technical panel, for which new or additional funding is requested." In order to perform this review, the NITC and DAS-Budget Division require agencies/entities to complete this form when requesting new or additional funding for technology projects. For more information, see the document entitled "Guidance on Information Technology Related Budget Requests" available at <http://www.nitc.state.ne.us/forms/>.

Electronic versions of this form are available at <http://www.nitc.state.ne.us/forms/>.

For questions or comments about this form, contact the Office of the CIO/NITC at:

Mail: Office of the CIO/NITC  
521 S 14th Street, Suite 200  
Lincoln, NE 68508  
Phone: (402) 471-3560  
Fax: (402) 471-4608  
E-mail: [info@cio.state.ne.us](mailto:info@cio.state.ne.us)

**Submission of Form**

Completed forms must be submitted by the same date biennial budget requests are required to be submitted to the DAS Budget Division. Completed project proposal forms must be submitted via e-mail to [info@cio.state.ne.us](mailto:info@cio.state.ne.us). The project proposal form should be submitted as an attachment in one of these formats: Microsoft Word; WordPerfect; Adobe PDF; or Rich Text Format. Receipt of the form by the Office of the CIO will be confirmed by e-mail. If an agency is unable to submit the application as described, contact the Office of the CIO prior to the deadline, to make other arrangements for submitting a project proposal form.

**Section I: General Information**

Project Title	KMNE-TV NTSC Transmitter Replacement
Agency (or entity)	Nebraska Educational Telecommunications Commission

## Contact Information for this Project:

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**Section II: Executive Summary**

Provide a one or two paragraph summary of the proposed project. This summary will be used in other externally distributed documents and should therefore clearly and succinctly describe the project and the information technology required.

This project will replace the existing KMNE-TV transmitter near Bassett, NE. The replacement is necessary for Nebraska Educational Telecommunications Commission (NETC) to continue to provide public educational television programming to Bassett, and the north-central part of Nebraska. The current transmitter is nearly 20 years old and approaching the end of its useful life. The transmitter uses costly tubes needing periodic replacement. A new solid state transmitter will use transistors, eliminating the costly tube replacements. Parts for the current transmitter are becoming difficult to obtain on a timely basis, and are very costly. As the transmitter ages, the need for replacement parts increases.

There are essentially 3 stages to the DTV conversion. The first is the period of build out. At this point in the process, the new DTV is being installed and tested on a new channel assigned by the FCC. NETC currently uses channel 7 in Bassett for NTSC (analog) transmission. We have been assigned channel 15 for an interim DTV channel. For a period of some years we will have to transmit full power NTSC and interim power DTV simultaneously. This is the second or simulcast phase of the conversion. Whenever the FCC authorizes termination of NTSC transmission, we will have to select a permanent DTV channel and use it. This DTV-only time will be the third stage of the conversion and it will then be complete. For a number of technical reasons, a lower channel assignment is preferred to a higher channel assignment. This means that when we reach the final step we will need to convert the NTSC transmitter to a DTV transmitter to occupy channel 7 and give channel 15 back to the federal government. By occupying channel 7 our electrical costs will be significantly lower than if we were to keep channel 15 instead. This is why we are only operating the interim DTV channel at an interim power and not at full power.

When the NETC eliminates NTSC transmissions in favor of DTV in the Bassett area per FCC regulations, the new transmitter will easily convert to digital. This is expected to occur sometime after 2006. The current transmitter is becoming problematic, and will not convert to digital at all.

The Commission anticipates funding from the federal Public Telecommunications Facilities Program (PTFP) for 40% of the cost of this equipment. The State's portion is considered by PTFP as matching funds.

**Section III: Goals, Objectives, and Projected Outcomes (15 Points)**

1. Describe the project, including:
  - Specific goals and objectives;
  - Expected beneficiaries of the project; and
  - Expected outcomes.

A combination of vendor and NETC engineers will remove the current NTSC television transmitter in place at KMNE. They will then install a new solid state transmitter including coupling to the antenna and proof of performance testing. Purchase and installation of an

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antenna and transmission line are not in the scope of this project. The transmitter purchase, installation and electrical wiring are included in this project.

The goals and objectives include:

- Continue public and educational television programming to Bassett, Nebraska and the surrounding region.
- Provide reliable facilities in the most cost-effective way.
- Ensure the smoothest possible transition to DTV when required.

Beneficiaries of the project will include:

- Nebraska citizens living in the KMNE coverage area will continue to receive programming.
- The State of Nebraska will be able to retain the FCC license for that station.
- The State of Nebraska will save in maintenance costs.
- Schools will continue to receive the new digital services that will be offered in DTV such as datacasting.

Expected outcomes include:

- When the requirement for NTSC transmissions is complete in the Bassett area, the interim DTV transmitter will be turned off, and this analog transmitter will be converted to digital. The time frame for that conversion is unknown, and outside the scope of this project proposal.
- DTV coverage will then be on a lower channel assignment than the interim channel so the electrical power required to operate the channel will be lower.
- Maintenance costs will decrease because of the use of a solid-state transmitter as opposed to a large tube style transmitter.
- Once this transmitter is converted to DTV when the FCC authorizes turning off NTSC, the lower power, higher channel interim DTV transmitter will be turned off.

2. Describe the measurement and assessment methods that will verify that the project outcomes have been achieved.

The outcomes can be measured in the following ways:

- NETC will receive authorization from the FCC to terminate NTSC service. This will trigger the conversion of this transmitter to DTV. The result will be a battery of technical tests to insure the conversion has been properly accomplished.
- NETC will be able to compare maintenance costs of this new transmitter with those of the transmitter it will replace. We can also compare the costs of maintaining this transmitter by itself once NTSC has finished with the cost of maintaining both NTSC and DTV as required by the FCC until then.
- NETC can confirm electrical savings by comparing electrical bills before and after the replacement of the existing transmitter as well as once the interim DTV transmitter is shut off.

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3. Describe the project's relationship to your agency comprehensive information technology plan.

This request is specifically described in the NETC Comprehensive IT Plan for FY2004 and FY2005 on page 7 in the section titled "Conversion Plan for Transmissions." Specifically this is one of 2 remaining transmitters to be converted before the end of the NTSC/DTV simulcast period. NETC is requesting these last two transmitters in the FY04 and FY05 biennium (1 per year) as stated in the IT plan.

**Section IV: Project Justification / Business Case (25 Points)**

4. Provide the project justification in terms of tangible benefits (i.e. economic return on investment) and/or intangible benefits (e.g. additional services for customers).

Tangible benefits will include:

- Reduced maintenance costs.
- Retention of FCC license.
- Reduced electrical costs.
- Continued services to the Bassett area.
- Reduced air-conditioning requirements on the building.
- Increased reliability by replacing the aging existing transmitter.
- Continue statewide availability of the Emergency Alert System.
- Funding the project provides the matching funds required to receive the federal PTFP grant.

Intangible benefits will include:

- Maintaining the status NETC holds as a complete statewide network.
- Decrease the number of transmitter failures.
- Keep the national reputation earned by NETC as a technological leader.

5. Describe other solutions that were evaluated, including their strengths and weaknesses, and why they were rejected. Explain the implications of doing nothing and why this option is not acceptable.

In this situation the only alternatives are among the various types of transmitters or to not upgrade at all. The specific selection of the kind of transmitter will be accomplished through the bid process with the help of the State Department of Administrative Services, Materiel Division.

Not completing this project would mean that at the end of the simulcast period, we would have to keep the higher channel assignment on less than full power. This would mean decreased coverage for a higher electrical cost.

6. If the project is the result of a state or federal mandate, please specify the mandate being addressed.

The Federal Communications Act of 1996 is what caused the DTV conversion requirement to begin. In order to maintain the FCC license, the State of Nebraska must complete the conversion including all 3 phases described earlier. This means we must be able to convert

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the current NTSC transmitter to a DTV transmitter at the end of the simulcast period. The current transmitter is not capable of conversion.

**Section V: Technical Impact (20 Points)**

7. Describe how the project enhances, changes or replaces present technology systems, or implements a new technology system. Describe the technical elements of the project, including hardware, software, and communications requirements. Describe the strengths and weaknesses of the proposed solution.

This project enhances current technology in that it will allow the NTSC transmission system to eventually be upgraded to a DTV transmission system. The current transmitter can not be upgraded. It changes present technology by moving away from large tube-based systems to solid-state systems. This project replaces present technology later in that the NTSC will become DTV after the simulcast period is over.

The current transmitter is an array of cabinets with gradually more powerful tubes in them. The new transmitter will be just a few racks of electronics that will include an array of electronic components such as large-scale capacitors.

The portion that can be upgraded is just a small independent piece of equipment. The analog transmitter will be fed by an analog exciter, which converts incoming video from a satellite feed to a radio frequency signal that can then be fed to the rest of the transmitter for power boosting. To upgrade the system to DTV, the exciter is simply replaced with a modulator that will take the digital signal from the satellite and convert it from one digital format (SMPTE 310M) to another (8VSB). The rest of the transmitter will serve the same function as before by boosting the power of the radio frequency signal.

Remote controls will also be enhanced with this system. Currently we must control the transmitter with an interface that converts serial data into electrical contact closures. With the new transmitter, we will be able to communicate directly with the processor controlling the systems via an IP-LAN connection.

The strengths of this plan include reducing the number of communication links for control, less physical space required, lower cooling and electrical requirements, and a long-term benefit in being prepared for the end of the simulcast period.

The only weakness in the plan is that the current transmitter has had some problems from time-to-time, but has not completely failed. Unfortunately, these kinds of projects are expensive. For this reason we can't wait until the system has fully failed or even nearly so. Both the State and the federal PTFP funding sources require long lead times to receive so we must guess at how early to ask for the funds to complete the project. In this case the simulcast period also drives the schedule. It could end as early as mid-2006. If we wait until the next biennium, we may have already lost our license hold on the channel assignment.

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8. Address the following issues with respect to the proposed technology:

- Describe the reliability, security and scalability (future needs for growth or adaptation) of the technology.
- Address conformity with applicable NITC technical standards and guidelines (available at <http://www.nitc.state.ne.us/standards/>) and generally accepted industry standards.
- Address the compatibility with existing institutional and/or statewide infrastructure.

Television transmitters are typically designed with a 20-year life cycle, though some have gone longer. Though failures are unusual, they can sometimes be expensive. As a part of the bid process, potential vendors are required to describe their warranty, service department policies, parts availability policies, parts depot locations and extended warranty options. Responses to these issues influence the decision to purchase. In addition, NETC keeps enough staff to maintain all of the systems and some on-site spares. All of this is to keep the transmissions up as required by the FCC.

As for security, there are normal physical security steps taken including remote door monitoring. The only remote control access is through a private data connection that is protected via firewall and physical separation from the normal building LAN.

There really are no scalability issues to address. The amount of power we can transmit is determined by the FCC. We have to build to that specification, but if we were to ask for and be awarded higher output power, this is a fairly easy technical process of adding amplifier modules. It would increase capital and electrical costs, so the incentive to up-size is limited.

The only NITC technical standard is related to the video and audio, which specifies MPEG-2 for synchronous distance learning networks. Though this system currently uses MPEG-2, the encoding system specifications are dictated by the FCC and will not be subject to the NITC standards. Likewise, video traffic on the DTV signal is not associated with live synchronous distance learning.

As for the existing infrastructure, the project is integral to the current statewide broadcast network that is operated by NETC. It is specifically intended to support the network and prepare the network to be able to fully implement DTV at the end of the NTSC/DTV simulcast period.

**Section VI: Preliminary Plan for Implementation (10 Points)**

9. Describe the preliminary plans for implementing the project. Identify project sponsor(s) and examine stakeholder acceptance. Describe the project team, including their roles, responsibilities, and experience.

Preliminarily, there are a great deal of planning efforts that must happen to begin the project. NETC will need to draft a set of technical specifications to submit to DAS Materiel. The two agencies will then need to work together to draft an invitation to bid. These same specifications will need to be submitted to the federal PTFP funding agency for their consideration for the 60% match.

Prior to delivery and installation, NETC will have to accomplish some changes in the KMNE building electrical system.

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Stake holders include the NETC (also the project sponsor), citizens of the State of Nebraska in the Bassett area, and educators who will benefit from the educational materials provided through the multicast and datacast services provided in the DTV signal. The NETC accepts the plans since the plans are being generated by NETC. Citizens of the State of Nebraska will benefit in two ways. First they will be able to continue to receive the services provided by NETC via broadcast services, and second they will benefit from the maintaining of the license by the State of Nebraska. Although NETC has not polled its viewers to see if it accepts this project, ratings are routinely gathered to understand the households in any given viewing area. Since there are consistently large numbers of households viewing the services of NETC, it is reasonable to assume that these homes view the service as an asset and would support keeping the service. Finally, it is difficult to measure acceptance by educators regarding the use of the DTV services offered since the system has not been turned on yet in order to save operational dollars in electricity. However, one of the services to be supplied is currently used by many K-12 teachers around the state. It is referred to as Schools Telelearning Service (STS). This service will continue on DTV. NETC has specific polling information that shows widespread use of this service by teachers statewide. As with broadcast ratings, it is reasonable to assume that if these educators are using the STS programming, they would want to continue to use it after the DTV transition is complete.

Michael Beach is the Chief Technology Officer for NETC. It will be his job to see that all the planning and purchasing process is completed in accordance with the technical needs, and the rules and regulations for purchases made by the State. Mr. Beach has 15 years of experience in engineering and operations management of network delivered broadcast traffic and has worked at NETC for 4 years.

Paul Sautter is the Assistant Director of Engineering for Transmissions. It will be his responsibility to oversee the shipments and accounting for all deliveries. He will also be tasked to make the technical decisions required through the planning, selection and installation process. Mr. Sautter has more than 30 years of television and radio broadcast transmitter engineering and management experience.

Leo Opp is the DTV Transmissions Engineer. It will be his responsibility to directly supervise installation and testing activities at the KMNE site. He will also be tasked with all system documentation. Mr. Opp has 40 years of experience in television production and transmitter engineering.

10. List the major milestones and/or deliverables and provide a timeline for completing each.

<u>Milestone / Deliverable</u>	<u>Completion</u>
PTFP funding applied for	February 2004
PTFP funding awarded	October 2004
Invitation to bid drafted and published	November 2004
Invitation to bid awarded	January 2005
Site preparations complete	February 2005
Transmitter delivered	March 2005
Installation complete	April 2005

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11. Describe the training and staff development requirements.

NETC has experienced staff who already maintain and operate television transmitters throughout the state. Training would be limited to the specific operational requirements of the transmitter supplied through the bid process. As a part of the bid, NETC requires the successful vendor to supply the needed training. This training often includes sending some NETC personnel to the factory for in-depth maintenance and operational skills.

12. Describe the ongoing support requirements.

As a part of the purchase, NETC will stock up on needed spares for the most vulnerable portions of the transmitter. Most of these systems require an occasional board swap. The routine maintenance and repairs will be the responsibility of the KMNE site manager. NETC will take full advantage of the warranty offered by the manufacturer. After that, NETC maintains an operational budget line item for annual maintenance costs of each of its transmitters. Since this transmitter will replace an older more problematic one, the current level of maintenance funding should be sufficient.

**Section VII: Risk Assessment (10 Points)**

13. Describe possible barriers and risks related to the project and the relative importance of each.

There are no real technical risks in this project since it will replicate the same sort of projects that have been done in FY00, FY01, FY02 and FY03. The technology has settled out such that there is not much guesswork involved.

Availability may be an issue. There are really only two companies now that manufacture this sort of technology. There have been many commercial broadcasters that have not upgraded to DTV by their deadline of May 2002. There is a potential that some public broadcasters won't make their deadline (same as our deadline) of May 2003. If this is true, then transmitter orders to these two manufacturers may increase significantly as the FCC takes action against delinquent broadcasters. They may buy to save their broadcast licenses. The result will be a backlog of deliveries and installations to both NTSC and DTV transmitters.

There is also a risk in funding. When the state funds it's half of the project, there is no guarantee that the PTFP (federal) funds will be awarded to complete the project.

The other risk relates to the NETC request for this same kind of project in FY04 for KLNE in Lexington, NE. If PTFP funds are not awarded for that project, NETC will ask to combine funds from that project and this in order to complete the KLNE project in the FY04-FY05 biennium.

14. Identify strategies, which have been developed to minimize risks.

As for the risk of availability, the only recourse for NETC is to purchase as early as funds are available. For the State that means the bid could be issued in July of 2003. This could

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minimize the time issue, but there is still the issue of PTFP funds. PTFP awards funds in September with spending to not occur before October. Since this project is in the second year of the biennium, and if the bid is put out in July 2004, it is likely that the purchase can be made and installation occur before the end of the fiscal year. The later the purchase is pushed back, the less likely that is to be true.

This transmitter purchase is one of two for the biennium. If PTFP does not award the federal funds in the first project (KLNE), NETC would request permission of the State to use the funds from this request to cover the rest of that project. The only recourse then would be for NETC to seek funds for this project in the following biennium (FY06-FY07). Since the simulcast period can not end before mid-2006, this would potentially cause a late shut off of the last NTSC channel. This is not likely because of the 85% rule discussed earlier. Since we can't shut off NTSC until 85% of households in the viewing area are able to receive DTV, chances are good that the two signals will have to be carried for a number of years beyond 2006. If we are simulcasting longer we risk more months with electricity bills on two transmitters, but we do not risk our broadcasting license.

**Section VIII: Financial Analysis and Budget (20 Points)**

## 15. Financial Information

Financial and budget information can be provided in either of the following ways:

- (1) If the information is available in some other format, either cut and paste the information into this document or transmit the information with this form; or
- (2) Provide the information by completing the spreadsheet provided below.

**Instructions:** Double click on the Microsoft Excel icon below. An imbedded Excel spreadsheet will be launched. Input the appropriate financial information. Close the spreadsheet. The information you entered will automatically be saved with this document. If you want to review or revise the financial information, repeat the process just described.



Excel Spreadsheet  
(Double-click)



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16. Provide a detailed description of the budget items listed above. Include:

- An itemized list of hardware and software.
  - If new FTE positions are included in the request, please provide a breakdown by position, including separate totals for salary and fringe benefits.
  - Provide any on-going operation and replacement costs not included above, including funding source if known.
  - Provide a breakdown of all non-state funding sources and funds provided per source.
- 
- Hardware (includes installation)
    - Solid-state TV transmitter for Channel 7 VHF
    - (includes exciter that can be upgraded to a modulator when ready to convert to DTV)
  - Software (included with hardware)
    - Remote control interface (SNMP via standard Category 5 cable)
  - No new FTE positions are required.
  - Ongoing operational costs are already accounted for in the NETC budget. This is a replacement of an existing transmitter and the maintenance funds for the existing transmitter will cover the new one.

17. Please indicate where the funding requested for this project can be found in the agency budget request, including program numbers.

It can be found in the capital request section as project proposal CC-5 KMNE Transmitter

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Section VIII: Financial Analysis and Budget

(Revise dates as necessary for your request.)

	Estimated Prior Expended	Request for FY2003-04 (Year 1)	Request for FY2004-05 (Year 2)	Request for FY2005-06 (Year 3)	Request for FY2006-07 (Year 4)	Future	Total
1. Personnel Costs							\$ -
2. Contractual Services							
2.1 Design							\$ -
2.2 Programming							\$ -
2.3 Project Management							\$ -
2.4 Other							\$ -
3. Supplies and Materials							\$ -
4. Telecommunications							\$ -
5. Training							\$ -
6. Travel							\$ -
7. Other Operating Costs							\$ -
8. Capital Expenditures							
8.1 Hardware			\$ 650,000.00				\$ 650,000.00
8.2 Software							\$ -
8.3 Network							\$ -
8.4 Other			Installation included in hardware cost				\$ -
<b>TOTAL COSTS</b>	\$ -	\$ -	\$ 650,000.00	\$ -	\$ -	\$ -	\$ 650,000.00
General Funds			\$ 390,000.00				\$ 390,000.00
Cash Funds							\$ -
Federal Funds			\$ 260,000.00				\$ 260,000.00
Revolving Funds							\$ -
Other Funds							\$ -
<b>TOTAL FUNDS</b>	\$ -	\$ -	\$ 650,000.00	\$ -	\$ -	\$ -	\$ 650,000.00